2

THE

FIRST FOUR RULES OF
ARITHMETIC,

RENDERED SO EASY
AS
O BE LEARNED IN A FEW WEEKS,
WITHOUT THE HELP OF A MASTER.

TO WHICH IS ADDED,

A NEW RULE,

CALLED,

The Rule of Short:

TO REDUCE
HE RULE OF THREE; SHORTER THAN
THE RULE OF PRACTICE.

THE SECOND EDITION.

By the Rev. Dr. JOHN TRUSLER. K

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PREFACE.

HAVE ever thought myſelf happy, when I could
f uſe to Mankind. Looking over the books
rithmetic already publiſhed, I have found
ſufficiently clear and conciſe to make a com-
accomptant, without the help of a maſter :
as nineteen perſons out of twenty, never have
ccaſion to trouble themſelves with more than
irſt Four Rules of Arithmetic, and are not
ſituation, always, where they can procure the
nce of a maſter, I have drawn out a plain
nt of theſe Four Rules, and flatter myſelf
with the help of a Set of Tables, which I
likewiſe framed, and called TRUSLER's FA-

MILY TABLES*, any common underſtanding m be in a few weeks ſufficiently maſter of Arit metic to anſwer all the common purpoſes life.

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* Theſe Tables may be had of the Publiſher of this Volum

NUMERATION

TEACHES to read or write any ſum in figures (refer to the Table) and that ſeries of figures beginning with the ſingle figure 9, and read upwards, will be in words as follow:

Nine.

Ninety-eight.

Nine hundred and eighty-ſeven.

Nine thouſand, eight hundred and ſeventy-ſix.

Ninety-eight thouſand, ſeven hundred and ſixty-five.

Nine hundred eighty-ſeven thouſand, ſix hundred and fifty-four.

Nine millions, eight hundred ſeventy-ſix thouſand, five hundred and forty-three.

Ninety-eight millions, ſeven hundred ſixty-five thouſand, four hundred and thirty-two.

Nine hundred eighty-ſeven millions, ſix hundred fifty-four thouſand, three hundred and twenty-one.

NUMERATION TABLE.

Hundreds of Millions.	Tens of Millions.	Millions.	Hundreds of Thouſands.	Tens of Thouſands.	Thouſands.	Hundreds.	Tens.	Units.
9	8	7,	6	5	4,	3	2	1
	9	8,	7	6	5,	4	3	2
		9	8	7	6,	5	4	3
			9	8	7,	6	5	4
				9	8,	7	6	5
					9,	8	7	6
						9	8	7
							9	8
								9

I. ADDITION.

THE firſt rule in Arithmetic is Addition, by which we ad one or more ſums to another.

Care muſt be taken here in ſetting down, or placing th figures. Units muſt be put under units, tens under tens, and ſo on. See the Numeration Table in the preceding page, or the following ſums :

£. To add theſe figures together, begin
87 with the units in the lower line, and add
5 them to the units above, proceeding on ſo
131 to the top. Thus 2 and 1 is 3; 3 and 5
42 is 8; 8 and 7 is 15; then ſet down the 5
—— under the units and carry the ten to the
Total 265£. tens; thus 1 ten and 4 is 5; 5 and 3 is 8;
—— 8 and 8 is 16: that is 16 tens; put down
the 6 under the tens, and carry the ten or ten tens, that is the one 100 to the hundreds; thus, 1 and 1 is 2; then put down the 2, and the ſum total will be 265.

To prove whether this be done right, add the figures over again, but begin at the top and reckon downwards: for example, 7 and 5 is 12; 12 and 1 is 13; 13 and 2 is 15; and ſo on; and if the ſum total is the ſame as the firſt, the work is ſuppoſed to be right done.

ADDITION AND SUBTRACTION TABLE,

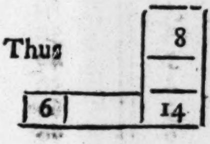
Which ſhould be got by heart.

1	2	3	4	5	6	7	8	9
2	4	5	6	7	8	9	10	11
3	5	6	7	8	9	10	11	12
4	6	7	8	9	10	11	12	13
5	7	8	9	10	11	12	13	14
6	8	9	10	11	12	13	14	15
7	9	10	11	12	13	14	15	16
8	10	11	12	13	14	15	16	17
9	11	12	13	14	15	16	17	18

The Uſe of this Table in Addition.

To find what any two figures make, ſuppoſe 6 and ; ok for 6 in the firſt or left hand column and 8 in the top e, and the ſum in the angle made by the two lines will be , the anſwer required.

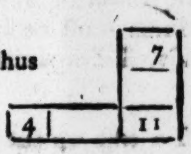
Thus



The Uſe of this Table in Subtraction.

To find what ſum any one figure ſubtracted or taken om the other will leave; ſuppoſe 4 from 11; look for 4 the firſt or left hand column, and 11 in the ſame line with ; then carry your eye to the top, and the figure in the top e over 11 will be 7, the thing required.

Thus



Sums in Addition where they conſiſt only of one denomina-
on, whether pounds, hundreds, months, days, &c.

	£.	Cwt.	Months.	Days.
	145	275		
	23	321	1321	27014
	4	48	1570	35760
	32	9	7650	42199
	1235	43	8329	89765
Total	1439£	696 Cwt.	18870 Mon.	194738 Days.

ADDITION of MONEY, WEIGHTS, and MEASURES.

Of Money.

PENCE TABLE.

		s.	d.	d.		s.
20	is	1	8	12	is	1
30	—	2	6	24	—	2
40	—	3	4	36	—	3
50	—	4	2	48	—	4
60	—	5	0	60	—	5
70	—	5	10	72	—	6
80	—	6	8	84	—	7
90	—	7	6	96	—	8
100	—	8	4	108	—	9
110	—	9	2	120	—	10
120	—	10	0	132	—	11
				144		12

SHILLING TABLE.

s.		£.	s.
20	is	1	0
30	—	1	10
40	—	2	0
50	—	2	10
60	—	3	0
70	—	3	10
80	—	4	0
90	—	4	10
100	—	5	0
110	—	5	10
120	—	6	0

Theſe Tables ſhould be alſo got by heart.

If the money be Engliſh, conſiſting of pounds, ſhillings, pence, and farthings, the ſums muſt be ſo placed, that the pounds ſhall be under pounds, ſhillings under ſhillings, and ſo on. Thus

	£.	s.	d.
	25	10	8¾
	15	0	7¼
	4	12	0½
	40	5	7
Total	£85	8	11½

To caſt up theſe ſums begin at bottom with the farthings; thus 2 and 1 is 3; 3 and 3 is 6; now 6 farthings is one penny and 2 farthings over; ſet down then the 2 farthings under the farthings and carry the penny to the pence: thus 1 penny and 7 is 8; 8 and 7 is 15; 15 and 8 is 23; now by the Pence Table you will find that 23d. is 1s. 11d.; put down the 11d. under the pence and carry the 1s. to the ſhillings: thus 1 and 5 is 6; 6 and 12 is 18; 18 and 10 is 28; now 28s. by the Shilling Table appears to be 1l. 8s. ſet down then the 8s. under the ſhillings, and carry the 1l. to the pounds; thus, 1 and 4 is 5; 5 and 5 is 10; 10 and 5 is 15; put down then the unit 5 under the units of the pounds and carry the 1 ten to the tens; thus, 1 and 4 is 5; 5 and 1 is 6; 6 and 2 is 8; then put down the 8, and the ſum is done: viz. £85 8 11½.

In caſting up a great many ſums of money, as at this
ark*, to eaſe the memory, when the number of farthings
mounts to 12, which is 3d. make a dot (.) and carry all
ove 12 to the farthings above; then, when you get to
e top, caſt your eye down the farthings and every dot will
3d. which is eaſily added to the number you have reck-
ned at the top; for example, ſee the ſum*.

*	£.	s.	d.
	123	5	8 ¾
	4261	14	7 ½
	375	10	11.¾
	1740	19	4 ¾.
	41	17	9 ½
	693	18	10 ¾
	42	16	11 ½
	90	14	8 ¾
	22	19	11 ¼
otal	£7393	19	0 ½

1 and 3 is 4; 4 and 2 is 6; 6 and 3 is 9; 9 and 2 is 11; 11 and 3 is 14; make a dot here for 12 and carry 2; 2 and 3 is 5; 5 and 2 is 7; 7 and 3 is 10. Now 10 farthings is 2½d. and 3d. for the dot is 5½d. ſet down then the ½ and carry the 5d. to the pence as before.

Now in the pence, when they amount to 60, that is 5s. do the ſame as in the farthings, make a dot (.) and carry the overplus
the figures above; thus, 5d. brought from the farthings
nd carried to the pence, 5 and 11 is 16; 16 and 8 is 24;
4 and 11 is 35; 35 and 10 is 45; 45 and 9 is 54; 54 and
is 58; 58 and 11 is 69: put now a dot for 60d. or 5s.
nd carry the overplus 9 to the 7 above, which makes 16;
6 and 8 is 24; that by the Pence Table is found to be 2s.
nd the dot you made is 7s. ſet down then an 0 under the
ence and carry the 7s. to the ſhillings.

Now in caſting up the ſhillings, do as follows; caſt up
e units of the ſhillings, leaving the tens till afterwards:
hus, 7 you brought from the pence and 9 is 16; 16 and 4
20; 20 and 6 is 26; 26 and 8 is 34; 34 and 7 is 41; 41
nd 9 is 50; 50 and 4 is 54; 54 and 5 is 59: put down
hen the 9 under the units of ſhillings and carry the 5 to the
ens; thus 5 and 1 is 6; 6 and 1 is 7; 7 and 1 is 8; 8 and
is 9; 9 and 1 is 10; 10 and 1 is 11; 11 and 1 is 12; 12
nd 1 is 13; that is, 13 times 10s.; take then the half of
3 to bring them into pounds; the half of 13 is 6 and 1
ver, put down the 1 under the tens of the ſhillings and
arry the 6 to the pounds, and caſt them up as before
irected.

In caſting up weights or meaſures, whether the weights
e Troy, Avoirdupoize, or Apothecaries; or whether the
eaſures be Cloth, Wine, Land, or any other, it is done
the ſame way with pounds, ſhillings, and pence, knowing

only

only in the weights how many drams or penny-weights make an ounce; how many ounces make a pound, &c. and in the meaſures, how many inches make a foot, how many feet a yard, and ſo on.

Troy weight.

Oz.	*dwt.*	*gr.*
6	18	21
7	15	6
2	15	12
8	14	23
26	2	14

Avoirdupoize Weight:

Ton.	*Cwt.*	*qrs.*	*lb.*	*ox.*	*dr.*
3	17	2	14	13	12
5	13	3	27	15	10
6	5	1	16	12	5
4	18	2	12	9	7
20	15	2	16	3	2

Cloth Meaſure.

Yds.	*qrs.*	*nails.*
35	2	2
76	2	1
38	3	3
42	1	1
193	1	3

Land Meaſure.

Acres.	*rds.*	*per.*
26	1	35
29	3	19
37	3	14
79	2	27
172	3	15

Wine Meaſure.

Hds.	*gal.*	*qts.*
44	55	3
93	19	2
63	23	1
47	41	2
249	14	0

II. SUBTRACTION.

BY Subtraction we take a leſs number from a greater, and ſhew the difference or remainder.

	£.
From	284
Take	196
Remainder	88
Proof	284

To do this, begin with the units in the leſs or bottom number, and where you cannot take the lower figure out of the upper, you muſt borrow 10 and add to the upper figure, taking care to repay to the tens, when you come to them, the 1 ten you borrowed. Thus in the ſum in the margin, 6 from 4 you cannot, but borrow 10 and add it to the 4, which makes 14; now take 6 from 14 and their remains 8; ſet down 8 then under the units and

y the 1, which is the ten you borrowed, to the tens ;
, 1 and 9, makes 10 ; now 10 from 8 you can-
but borrow 10 as before, and take the 10 from the 18
there remains 8 ; ſet down this 8 then under the tens,
carry the 1, or the one ten you borrowed, to the next
re, which added to the 1 makes 2 ; now 2 taken from
aves nothing, of courſe you might ſet down an 0 ; but
ſtanding the firſt figure on the left hand reckons nothing,
efore you may omit ſetting down that 0 ; and then the
ver or remainder will be 88 as in the margin.

o prove whether this be done right, add the remainder
the leſs number together ; and if the ſum total be the
e as the upper or greater number, it is right done.

SUBTRACTION of MONEY, WEIGHTS, AND MEASURES.

	£.	s.	d.
rom	317	16	9¼
ake	298	18	11¾
m.	18	17	9½
Proof	317	16	9¼

Begin with the farthings. 3 from 1 you cannot ; borrow therefore (not 1 ten as in the pounds) but 1d. being one of the next ſuperior number ; thus 1d. or four farthings added to 1 farthing makes 5 ; now take
rom 5 and there remains 2 ; ſet down then 2 farthings
der the farthings and carry the 1d. which you borrowed,
he pence ; thus 1 and 11 is 12 ; now 12 from 9 you can-
, but borrow 1s. or 12d. being 1 of the next ſuperior
nber ; add this 12d. to the 9 and it makes 21 ; now 12
m 21 and there remains 9 ; ſet down then 9 under the
nce and carry the 1s. you borrowed to the ſhillings ; thus,
1 that I borrowed and 18 is 19 ; 19 from 16 I cannot,
t borrow 1£. from the next ſuperior number, and add
s 1£. or 20s. to the 16 : thus 20 and 16 is 36 : take 19
m 36 and there remains 17 ; now ſet down 17 under the
llings and carry the 1£. you borrowed to the pounds ;
en ſay, 1 that I borrowed and 8 is 9 ; 9 from 7 I cannot,
t 9 from 17 (borrowing 10) and there remains 8 ; put
wn 8 under the pounds and carry the 1 ten borrowed to
e next figure ; thus, 1 that I borrowed and 9 is 10 ; 10
m 1 I cannot, but 10 from 11 (borrowing 1 again) and
ere remains 1 ; put down that 1 and go on, 1 that I bor-
wed and 2 is 3 ; 3 from 3 and there remains nothing.

To prove this, add, as before directed, the remainder the leſſer ſum together, and if the amount be the ſam the greater ſum, it is right done.

In Troy Weight, conſiſting of ounces, pennyweig and grains; when ſubtracting the grains (if neceſſary) row a pennyweight: in ſubtracting the pennyweights, row (if neceſſary) an ounce, and ſo on. Whatever are ſubtracting, always borrow from the next ſuperior ber, till you come to the greateſt number, I mean grea in denomination, not in quantity, and then you muſt bor ten.

	£.	s.	d.
Borrowed	813	16	7½
Paid	709	13	9¾
Remains to pay	104	2	9¾
Proof	813	16	7½

	£.	s.
Lent	718	16
Received	697	12
Remains due	21	3
Proof	718	16

	£.	s.	d.		£	s.
Borrowed	—	—	—		716	3
Paid at times	36	17	9			
	117	8	4			
	326	13	7	—	480	19
Remains to pay					235	3

	£.	s.		£.	s.
Lent	—	—	—	43	10
Received at different times	21	0			
	5	10			
	2	17	—	29	7
Remains due				14	3

QUESTION

QUESTIONS

BY WAY OF APPLICATION.

The preſent year is 1795. Suppoſing me born in how old am I ?

From 1795
Take 1735

60, the anſwer required.

One man was born in 1719, another in 1743 ; what difference of their ages ; or how much older is one the other ?

From 1743
Take 1719

24 years, the anſwer.

A tradeſman has four cuſtomers upon his book, A. . D. who altogether owe him £327, A. B. and C. owe of this £219, how much does D. owe him ?

£.
From 327
Take 219

£ 108 D. owes.

When an eſtate of £800 a year is reduced to £727 14s. xes ; how much are the taxes paid for ſuch an eſtate ?

	£.	s.
From	800	0
Take	727	14
	£ 72	6 anſwer.

5. What is the difference between 6731 and the am
of 217 added to 315?

		From	6731
Take	217 315	—	532
			6199 anſwer.

6. A houſe furniſhed is rated at £1516 13s. but wit
the furniture £1330 2s. what is the price of the furnitu

	£.	s.	
From	1516	13	
Take	1320	2	
£	196	11	anſwer.

7. A man, when firſt he began trade, had in caſh, ſt
&c. £1520; at the two years end, on counting up his ſt
book-debts, and caſh, he found the amount £2134
What did he gain in the two years?

	£.	s.	
From	2134	10	
Take	1520	0	
£	614	10	anſwer.

8. A father died worth in effects £3760. He left
ſons, and gave the youngeſt by will a houſe worth £
and the furniture valued at £236, and two horſes value
£18 each. What remained to the elder ſon?

		£.		£.
			From	3760
Take	Houſe	500		
	Furniture	236		
	2 Horſes	36	—	772
				£.2988

II. MULTIPLICATION.

MULTIPLICATION TABLE.

2	3	4	5	6	7	8	9	10	11	12
4	6	8	10	12	14	16	18	20	22	24
6	9	12	15	18	21	24	27	30	33	36
8	12	16	20	24	28	32	36	40	44	48
10	15	20	25	30	35	40	45	50	55	60
12	18	24	30	36	42	48	54	60	66	72
14	21	28	35	42	49	56	63	70	77	84
16	24	32	40	48	56	64	72	80	88	96
18	27	36	45	54	63	72	81	90	99	108
20	30	40	50	60	70	80	90	100	110	120
22	33	44	55	66	77	88	99	110	121	132
24	36	48	60	72	84	96	108	120	132	144

explain the uſe of this.table: ſuppoſe you wanted to how many is 9 times 7? Look for the figure 9 in the lumn on the left hand and the figure 9 in the top nd the number ſought for will be found in the angle en them.

Thus

	7
9	63

Multiplication, we multiply any given number by r, which ſaves the trouble of a great many additions ſame number. Thus inſtead of adding 3, ten times r to make 30, we multiply 3 by 10 to produce the mount.

In this rule there are three terms to be remembered

1. The Multiplicand, or number to be multiplied
2. The Multiplier, or number by which we multi
3. The Product, or number produced by multipl

Multiply 325 by 7.

To do this, ſet your figures down thus:

Multiplicand 325
Multiplier, 7

Product 2275

To be ready at Multiplication or Diviſion, it is eſſe neceſſary to have the Multiplication Table by heart perfectly ſo. This done, multiply firſt the units of th tiplicand by the multiplier. Thus ſay, as above, 7 ti is 35; then ſet down 5 under the units and carry th your mind; then multiply the 2d figure in the multip by the multiplier, and ſay 7 times 2 is 14 and the 3 brought from the units is 17; ſet down the 7 and ca the 1 as before; then multiply the next figure, and times 3 is 21 and the 1 I carried is 22. This 3 bei laſt figure to multiply, ſet down the 22, and the p or anſwer will be 2275.

The uſual way of proving Multiplication is by c out the nines from the multiplicand and multiplier remainder put on each ſide of a croſs: then multip figures on each ſide together, caſt the nines from th duct, and put the remainder at the top; then caſt o nines from the product of the multiplication and pla overplus at the bottom; and if the bottom figure ſame with the top, the work is ſuppoſed to be done Thus, to prove the ſum juſt done; throw out the from the multiplicand 325. How many times 9 in times is 27 and 5 over, carry this 5 and annex it to th figure 5, and it makes 55; the nines in 55 are 6 and 1 which 1 put on one ſide of a croſs, as at (a) Ne quire how many nines the multiplier? None, over; put that on the ſide of the croſs, as at then multiply the figu

(a) 1X

(b) 1X7

(c) 7 (d) 7
1X7 1X7
 7

each ſide the croſs together, thus 7 times 1 is 7; and as there are no nines in 7 put the 7 at top, as at (c). Now if by caſting out the nines in the oduct, there is a remainder of 7, the work was done ght. Enquire into this : throw out the nines in the pro- ct 2275. How many nines in 22 ? Twice 9 is 18 and 4 er; carry this 4 to the next figure 7 and it makes 47. ow many nines in 47 ? 5 times 9 is 45 and 2 over ; carry is 2 to the next figure 5 and it makes 25 : How many nes in 25 ? Twice 9 is 18 and 7 over : thus you ſee the ttom figure in the croſs (d) is 7, the ſame as at the top.

But the ſureſt way is to divide the product by the mul- plicand, and the quotient or product of ſuch diviſion will the ſame as the multiplier.

When the multiplier conſiſts of ſeveral figures, there uſt be as many products as there are figures in the multi- lier ; but take care to place the firſt figure on the right and of every product under that figure you multiply by ; ld theſe ſeveral products together and their ſum will be the otal product. Thus multiply 17856 by 325.

 o
oXI
 o

Multiplicand	17856
Multiplier,	325
Product	89280
Product	35712
Product	53568
Total Product	5803200

When there are cyphers between the figures in the multi- plier, they may be omitted, placing an o under the o in the multiplier, and taking care to place the firſt figure of the next product further to the left, under the figure by which you multiply. Thus,

 7
5X5
 7

Multiplicand	1625
Multiplier	104
Product	6500
Product	16250
Total Product	169000

When there are any cyphers at the end of the multip cand or multiplier, they may be omitted, by only mul plying by the reſt of the figures, and ſetting down on t right hand of the total product as many cyphers as we omitted. Thus,

1	Multiplicand	140
5X²	Multiplier	20
1	Product	2800

0	Multiplicand	27000
0X2	Multiplier	200
0	Product	5400000

MULTIPLICATION of MONEY, &c.

	£.	s.	d.
Multiplicand	25	13	2½
Multiplier			3
Product	76	19	7½

To do this multiply firſt the farthings; ſay 3 times farthings is 6; that is, 1d. and 2 farthings over; ſet dow the 2 farthings and carry the 1d. to the pence; then ſay times 2d. is 6d. and the penny I brought from the farthing is 7d.; ſet down then the 7d. under the pence and procee to the ſhillings. Next multiply the ſhillings, and ſay, times 13 is 39; that is, 1l. 19s. put down the 19s. an carry the £1 to the pounds, ſaying 3 times 5 is 15 and th £1 brought from the ſhillings is 16; put down the 6 unde the units of the pounds and carry the 1, or one ten, to th next figure; thus 3 times 2 is 6 and 1 is 7, and put dow the 7; and the ſum is done. 76l. 19s. 7½d.

The proof of this is by diviſion, that is, by dividing 76l. 19s. 7½d. by 3, and if the quotient or product of tha diviſion is 25l. 13s. 2½d. the ſame as the multiplicand, i is right done.

Multiplication of any meaſure or weight may be done i the ſame way, remembering only to divide the product by a many of that as will make one of the next ſuperior quantity ſetting down the remainder and adding the quotient or product ct of ſuch diviſion to the next ſuperior quantity after it multiplied; as was done in pounds, ſhillings, and pence, rrying the pence to the ſhillings and the ſhillings to the unds.

If the multiplier is above 12, multiply by any two num-rs, which multiplied together will make the ſame number; t if no two numbers multiplied together will make the act number, then multiply the multiplicand or top line as many as are wanting, adding it to the laſt product. hus, multiply 3l. 7s. 2d. by 29 and the product will be l. 7s. 10d. worked as follows: multiply firſt by 3 and xt by 9 and afterwards by 2; for 3 times 9 is 27 and 2 is .

	£.	s.	d.	
Multiply	3	7	2	Multiplicand.
by			3	Multiplier.
Then multiply	10	1	6	Product.
by			9	Multiplier.
	90	13	6	Product.

ext multiply the Multiplicand or top line 3 7 2

by 2

This 6 14 4 — 6 14 4

dded to 90 13 6 gives 97 7 10 the anſwer.

Queſtions by way of Application.

1. What ſum of money does it require to give 14 men 2l. 10s. each.

4 times 3 is 12, and 2 is 14.

Multiply therefore 12 10 firſt

by 4

50 0 and then this

by 3

150 0

Then multiply 12 10

by 2

25 0 added to 150 — 25 0

gives 175 0 the anſwer.

2. The prize money of a merchant-ſhip taken by a p
vateer with 250 men on board, when divided equally amo
them amounted to 15l. 10s. each : what was the value
the prize ?

£.
Firſt multiply 250
by 15 for the Pounds,

1250
250

£ 3750 then take the half of 250 for the
and add that 125 £ [10s. being half of a

£ 3875 the anſwer required.

3. A merchant had £19118 to begin buſineſs with;
five years he cleared £1086 a year, the next four years
made clear 2715l. 10s. 6d. a year; but the laſt three yea
he was in trade, he had the misfortune to loſe, one year wi
another, 475l. 4s. 6d. a year : what was his real fortune
the 12 years end ?

£.
Multiply 1086
by 5

The gain of 5 years 5430

Multiply 475 4 6
by 3

The loſs of 3 years 1425 13 6

Multiply 2715 10 6
by 4

10862 2 0 the gain of 4 years.
Add 5430 0 0 the gain of 5 years.

16292 2 0
Subtract 1425 13 6 the loſs of 3 years.

14866 8 6 clear gains in 12 years.
Add 19118 0 0 the firſt capital.

Total 33984 8 6 the anſwer required.

4. In 780l. 15s. 9d. how many pence?

Multiply the pounds firſt by 20 (there being 20s. in a £.) nd add the ſhillings to them, and that product will be illings; then multiply that product by 12, adding the ence, to bring them into pence (there being 12d. in 1s.) Thus,

	£.	s.	d.
Multiply	780	15	9
by	20		
	15600 s.		
Add	15 s.		
Multiply	15615 s.		
by	12 d.		
	187380 d.		
Add	9 d.		
Anſwer	187389	Pence.	

The proof of this by Diviſion, dividing the pence firſt into ſhillings and the ſhillings next into pounds, and if the laſt quotient or product of ſuch diviſion be 780l. 15s. 9d. the multiplication was right.

IV. DIVISION.

BY Diviſion we find how often one number is contained in another, and learn to divide any number into what parts we pleaſe.

1. The number to be divided is called, The Dividend;
2. The number by which we divide, is called, The Diviſor;
3. The number that ſhews how often the diviſor is contained in the dividend, is called, The Quotient.

N. B. If there be any remaining number, after the work is done, it is of the ſame name or denomination as the dividend, as will be further explained.

When the diviſor, or number you divide by, does not exceed 12, your diviſion may be ſhort and eaſily done.

Thus, divide 78510 by 4.

Dividend.
Diviſor 4) 78510 (2 Remainder

19627 the Quotient
Multiply by 4 to prove it

78508
Add 2 Remainder

78510 the Proof.

Place the figures as above; then ſay, how many times 4 in 7? that is, how many times is the diviſor contained i the firſt figure of the dividend? 1 and 3 over, put dow 1 then under the 7 and carry the 3, as three tens, to the next figure 8, which makes 38; then ſay how many fours in 38? If you know the Multiplication Table by heart you will know that 9 times 4 is 36; there are 9 fours therefore and 2 over; put down 9 under the 8 and carry the 2 to the next figure 5; then ſay how many fours in 25? 6 times 4 is 24 and 1 over; put down the 6 under the 5 and carry the 1 to the next figure 1, which makes that 1 11. How many fours in 11; 2 times 4 is 8 and 3 over; put down 2 under the 1 and carry the 3 to the 3, which makes it 30; then ſay how many times 4 in 30? 7 times 4 is 28 and 2 over; put down then the 7 under the 0, and place this laſt remaining 2, as you ſee it placed in the ſum above. This remainder is of the ſame name or denomination with the dividend; if that be pounds, this remainder is pounds; if that be yards, this remainder is yards, and ſo on.

To prove this, multiply the quotient by the diviſor, adding the remainder, (if any) and the product, if it be the ſame as the dividend, ſhews that it is right.

Dividend.
Yards. *Yd*.
Diviſor 9) 64783 (1 Remainder

Quotient 7198 Yards.

Dividend.
£. £.
Diviſor 12) 432075 (3 Remainder

Quotient 36006 £.

f the diviſor be more than 12, try how often it is con-
ed in the firſt two or three figures of the dividend, and
n you have found the greateſt number of times it is
ained in thoſe figures, ſet that number down in the
tient; then multiply the diviſor by that quotient num-
; put the product down under the firſt two or three
res of the dividend and ſubtract it from that dividend:
to the remainder bring down the next figure from the
dend, and annex it to the remainder as a new dividend.
this till you have got through all the figures and the
k is done. Thus,

```
   Diviſor.   Dividend.   Quotient.
     25)       53468       (2138
               50            25 multiply by this
               —           ——
               .34         10690
               25          4276
               —             18 Remainder
                .96        ———
                75         53468 Proof.
                —          ———
                218
                200
                ——
Remainder        18
```

ay how many times 25 in 53? 2. Put down then 2 in
quotient and multiply the diviſor 25 by 2. Twice 25 is
put down 50 under the firſt two figures of the dividend,
ſubtract it from them, the remainder will be 3; to this
ring down the next figure of the dividend, 4, which
exed to the 3, will make 34 for a new dividend; then
how many times 25 in 34? 1. Put down the 1 in the
tient; by this 1 multiply the diviſor 25, ſet down the
duct under the 34, and ſubtract the 25 from 34, which
es 9; to this 9 bring down the next figure 6 of the
idend as before, and continue doing the ſame till the
ole is finiſhed, and you will find there is 2138 times 25
3468 and 18 over.

Vhen there are any cyphers at the end of the diviſor, to
ten the work, they may be cut off; but then you muſt
cut off as many figures from the end or right hand of
dividend, as you cut off from the diviſor, taking care
e laſt to annex thoſe figures cut from the dividend to
remainder. Thus,

Diviſor. Dividend.
2|00) 7896|54 (54 Rem.
Quotient 3948

Diviſor. Dividend. Quoti
5|00) 9432|10 (6
90
43
30
132
120
1210 Rem.

Cutting off the two oo in the diviſor and the laſt two fig of the dividend, viz. 54, you divide the remainder 78,6 2, which leaving no remainder, the 54 ſo cut off will be remainder: ſo in the ſecond ſum, cutting off the oo from diviſor and 10 from the dividend, divide by 15, the mainder will be 12, to which add 10 cut off, and true remainder will be 1210.

When the diviſor may be made of any two figures m tiplied together, as 6 times 9, ſuppoſing the diviſor to 54; or 3 times 7, ſuppoſing it to be 21, or the like; t by dividing the dividend by one figure and the quotient the other, the remaining quotient will be the anſwer requi But, as it ſometimes happens, that there is a remainde each of the quotients and neither of them the true one, right remainder may be thus found.

Multiply the laſt remainder by the firſt diviſor an that product add the firſt remainder, and this will give true remainder.

Divide 43280 by 54. To do this, divide firſt by 9 next by 6; 6 times 9 making 54.

Dividend.
9) 43280 (8 Remainder
6) 4808 Quotient (2 Remainder
The anſwer required 801 (26 remaining.

Laſt Remainder	— —	2
Firſt Diviſor	— —	9
9 times 2 is		18
Firſt Remainder	—	8 Add th
True Remainder	— —	26

Divi

DIVISION OF MONEY, &c.

In diviſion of money, divide the firſt denomination on left hand, that is, the pounds, and if any remain, ltiply the remainder by as many of the next leſs denonation as make one of that ; for inſtance, 20, 20s. makg £1, which add to the ſhillings, being the next leſs demination, and divide as before ; and go on ſo with the nce and the farthings, till the whole is completed. The oof is, as before, by multiplication.

£.	s.	d.	
37	3	7¾	
6	3	11¼	
		6	
37	3	7½	
		¼	Rem.
37	3	7¾	Proof.

Say, how many times 6 in 37 ? 6, and 1 over ; put down 6 under the pounds, and multiply that 1 by 20, adding the 3s. this makes 23s. then, how many times 6 in 23 ? 3, and 5 over ; put down the 3 under the ſhillings, and multiply the 5 by 12d. to bring them into pence ; 12 times 5 is 60, and add the 7d. this makes 67d. ; then, how many times 6 in 67 ? 11 and over ; put down 11 then under the pence, and multiply e 1 by 4, to bring it into farthings, adding the ¾. Once s 4 and 3 is 7 ; how many times 6 in 7 ? 1. and one farng over. Thus you have the anſwer 6l. 3s. 11½d. and e farthing over.

The ſame thing you may do by weights and meaſures.

Queſtions by way of Application.

1. If a man ſpends 327l. 6s. in 12 months, how much is t a month ?

	£.	s.		
12)	327	6		
	27	5	6	a Month.

2. If 25 yards of linen coſt 4l. 7s. how much is that a rd ?

	£.	
Multiply	4	
by	20	to bring it into ſhillings, adding [the 7.
25)	87	(3s.
	75	
	12	s. remaining

Multiply 12 *s.* remaining
by 12 *d.* to bring the 12*s.* into pence

25) 144 (5*d.*
125

Multiply 19 *d.* remaining
by 4 farthings to bring the 19*d.* into farth

25) 76 (3 farthings
75

1 farthing remaining.

Thus the anſwer required is 3*s.* 5¾d. a yard.

3. A prize of 9329l. 4s. 3d. divided between 50 m
what is each man's ſhare?

£. *s.* *d.*
Men 5|0) 932|6 4 3

186 (26 £ remaining
20 *s.*

520 *s.*
4 *s.*

5|0) 52|4
10 (24 *s.* remaining
12 *d.*

288 *d.*
3*d.*

5|0) 29|1

5 (41 *d.* remaining
4 farthings

5|0) 16|4 farthings

Farthings 3 (14 farthings remaini

Anſwer 186l. 10s. 5¾d. and 14 farthings or 3½d. over.

4. In 7699d. how many pounds?

ivide by 12 to bring them into ſhillings, and that quo- by 20 to bring the ſhillings into pounds; but when you brought the pence into ſhillings, inſtead of dividing by you may cut off the laſt figure on the right hand and half the reſt, that is, divide by 2: this half will be ds; if there be 1 remaining that 1 will be 10s. to which the laſt figure cut off, which is ſhillings alſo.

d. *d.*
12) 7699
64|1 *s.* and 7*d.* over.
32 £ and 1*s.* over.
Anſwer 32l. 1s. 7d.

. In 36571 ſhillings, how many pounds?

s. *s.*
2|0) 36571|7
£ 18285 17 anſwer.

6. What does 7325 lb. come to at 1 farthing a lb.

ote. When the price is leſs than a penny, divide by 4, even parts of a penny, to bring it into pence; then by the even parts of 1s. to bring the pence into ſhillings; laſt by 10, the even parts of £1 to bring the ſhillings pounds. Thus,

lb.
4) 7325
12) 1831 *d.* 1 farthing over
20) 15|2 *s.* 7*d.* over.
£ 7 12 $7\frac{1}{4}$ the anſwer.

7. What does 346 lb. come to at 3d. a lb.?

Here, as the price is above farthings, you may begin

and divide by the 4th part of a ſhilling, which is 3d, as
Practice Table at the end will ſhew.

lb.
346

20) 86 *s* and 2 over, that is 2 three pen

£ 4 6 6 the anſwer.

8. What does 353 lb. of ſalt come to at 4½d. a lb.

Divide 353 by 3 for 4d. the third part of 1s. to bring
into ſhillings, and then that quotient by 8; one halfpen
being the eighth part of 4d. Add theſe together and
product will be the anſwer.

lb.
3) 353

8) 117 *s.* 8*d.* 8d. being the 3d part of 2s. o
Remains 14 *s.* 1*d.* and 5s. over, the 8th part
Add this 7½ [which is 7

20) 13|2 4½

£ 6 12 4½ the anſwer.

9. How much does 5960 yards come to at 1l. 17s. 9
a yard? the ſhort way is as follows:

	£.	*s.*	*d.*		£.	*s.*
At	1	0	0	a yard it comes to —	5960	0
For	0	10	0	do. that is ½ a £ add half of 5960—	2980	0
For	0	5	0	do. that is ½ 10s add half of 2980—	1490	0
For	0	2	6	do. that is ½ 5s. add half of 1490—	745	0
For	0	0	3	do. that is $\frac{1}{10}$th of 2s. 6d. add $\frac{1}{10}$th of 745—	74	10
For	0	0	0½	do. that is $\frac{1}{6}$ of 3d. add $\frac{1}{6}$ of 74 10 —	12	8
	1	17	9½	(the price per yard) The anſwer £	11261	18

To avoid multiplicity of figures, ſet down your ſums as ow, uſing the characters annexed :

+ Implies added.
× ditto multiplied.
— ditto ſubtracted.
= ditto equal.

FOR EXAMPLE.

$$7+4=11-3=8\times 3=24.$$

Thus 7 added to 4, equals 11 : 11, ſubtracting 3, equals 8, multiplied by 3, equals 24.

What ſum will 27 taken from 105; 40 added to 120; 4 times 39 make?

$$\begin{array}{l} 105-27=78 \\ 40+120=160 \\ 39\times 4=156 \\ \hline 394 \text{ Anſwer} \end{array}$$

Or $78+160+156=394$

I mean to give my ſons A. B. and C 500l. each.
I gave A only 270, having no more then to ſpare.
B 597, becauſe he wanted it.
C 633, the remainder to ſettle with his bro.
rs.

1500

How much ſhould B and C give up to A, to make their unes equal ?

$$\left.\begin{array}{l} \text{B } 597-500=97 \\ \text{C } 633-500=133 \end{array}\right\}\text{Anſwer}$$

$$\text{A } 270+97+133=500 \text{ Proof.}$$

e following is a New Rule, but a ſhorter one than ractice, and as I have ſeen it in no book of Arithmetic, I will give it the name of the *Rule of Short*.

If one yard coſts 16s. what will 252 yards coſt? ultiply the number by half the price, and twice the ſum he units will be the odd ſhillings ; then carry the tens of product to the other figures, and multiply them by the number for the pounds, thus :

Multiply 252 yards
by 8, half the price of one yard.

£.201 12s. Anſwer.

Say, as above, 8 times 2 is 16. Of this 16, 6 i unit ; now, ſince the ſum of the units is 12s, ſet this for the odd ſhillings ; then, carry the ten of the 16 t next figure, and go on multipling by the ſame number 8; ſay, 8 times 5 is 40, and 1 ten is 41 ; put down 1, an 8 times 2 is 16, and 4 is 20, and put down 20, and th ſwer is obtained. Now I will write the above in a m ſhorter compaſs, by the characters I have pointed out, t

8×2=16
Half of 6=12s. - - £201 12s.
8×5=40+1=41
8×2=16+4=20

By this New Rule the anſwer is got at by 9 figures. Practice, as ſhewn before, it would be got at thus :

		252 yards
At 10s.	is the half of	126£
5	ditto	63
1	the 5th of ditto	12 12s.
16s.		£201 12s.

In this laſt mode it takes 23 figures.

Another Example of this new Rule.

If one pound coſts £1 18s. what will 327 pounds co We have here only to find the price, at 18s. per lb. and it to 327, which is the price of that number of lbs. at per lb.

327
9
294 6
327
£.621 6s. 0d. Anſwer.

Now to prove it, try it the other way by Practice.

At £1 0 0	-	-	£327	0	0	
0 10 0	-	-	163	10	0	
0 5 0	-	-	81	15	0	
0 2 6	-	-	40	17	6	
0 0 6	-	-	8	3	6	
£1 18 0			£621	6	0	Anſwer.

You ſee the New Rule is conſiderably the readieſt ; but it will do only when the price or part of the price n ſhillings, and the ſhillings are an even number, e 12. If the ſhillings are 13,15,17,19, do it by Practice.

the Price does not exceed 12s. it is done by multiplica- thus :

252 yards
12s.

Bring this into pounds, 302 | 4 by cutting off the unit 4, and taking ½ the remainder, 302, thus 151 | 4 the anſwer

PRACTICE TABLE.

Of a Pound.

d.		
0	is	½
8	—	⅓
0	—	¼
0	—	⅕
4	—	⅙
6	—	⅛
0	—	1/10
8	—	1/12
3	—	1/16

Of a Shilling.

is	½
—	⅓
—	¼
—	⅙
—	⅛
—	1/12.

Of a Ton.

Cwt.		
10	is	½
5	—	¼
4	—	⅕
2½	—	⅛
2	—	1/10

Of an Hundred-weight

qrs.	lb.		
2 or	56	is	½
1	28	—	¼
	16	—	1/7
	14	—	⅛
	8	—	1/14
	7	—	1/16

Of a Quarter.

lb.		
14	is	½
7	—	¼
4	—	1/7
3½	—	⅛

TABLES

TABLES OF WEIGHTS AND MEASURES.

Ale and Beer Measure.

2 Pints make 1 Quart
4 Quarts 1 Gallon
8 Gallons 1 Firkin of Ale
9 Gallons 1 Firkin of Beer
2 Firkins 1 Kilderkin
2 Kilderkins 1 Barrel
3 Kilderkins 1 Hogſhead
3 Barrels 1 Butt

Wine Measure.

4 Gills make 1 Pint
2 Pints 1 Quart
4 Quarts 1 Gallon
42 Gallons 1 Tierce
63 Gallons 1 Hogſhead
84 Gallons 1 Puncheon
1½ Tierce 1 Hogſhead
2 Hogſheads 1 Pipe or Butt
2 Pipes 1 Tun

By this Meaſure all Brandies, Spirits, Mead, Cyder, Perry, and Oil are meaſured.

Dry Measure.

2 Pints make 1 Quart
2 Quarts 1 Pottle
2 Pottles 1 Gallon
2 Gallons 1 Peck
4 Pecks 1 Buſhel
8 Buſhels 1 Quarter
5 Quarters 1 Wey or Load
5 Pecks 1 Buſhel of Water Meaſure
4 Buſhels 1 Coomb
10 Coombs 1 Wey
2 Weys 1 Laſt of Corn

By this Meaſure, Salt, Lead-Ore, Oyſters, Corn, and other dry goods are meaſured.

Corn Measure.

2 Quarts make 1 Pottle
2 Pottles 1 Gallon
2 Gallons 1 Peck
4 Pecks, or 8 Gallons, Buſhel
8 Buſhels 1 Quarter or Va
5 Quarters of Wheat, Beans, or Peas 1 Load
10 Quarters of Oats 1 Load

Coal Measure.

4 Pecks make 1 Buſhel
9 Buſhels 1 Vat or Strike
36 Buſhels 1 Chaldron
21 Chaldrons 1 Score

Note. In 5 Chaldrons o Coals the Seller always giv 9 Buſhels over.

Cloth Measure.

2½ Inches make 1 Nail
4 Nails 1 Quarter of a Yard
4 Quarters 1 Yard
5 Quarters 1 Ell Engliſh
3 Quarters 1 Ell Flemiſh
6 Quarters 1 Ell French

Scotch and Iriſh Linens ar bought and ſold by the Yard Engliſh; but all Dutch Linens are bought by the Ell Flemiſh, and ſold by the Ell Engliſh.

Land or Long Measure.

3 Barley-corns make 1 Inch
12 Inches 1 Foot
3 Feet 1 Yard
5½ Yards 1 Pole or Perch
40 Poles 1 Furlong or Roof
8 Furlongs 1 Mile
3 Miles 1 League
20 Leagues 1 Degree
69½ Miles 1 Degree

This treats of Length only.

Square Measure.

144 Square Inches 1 Square Foot

9 Square

Square Feet 1 Sq. Yard
0½ Square Yds. 1 Sq. Pole
Square Poles 1 Sq. Rood
Square Roods 1 Sq. Acre
Square Acres 1 Sq. Mile
This includes Length and
adth.

Cubic Measure.

28 Cubic Inches 1 Foot
27 Cubic Feet 1 Cubic Yard
This comprehends Length,
adth, and Thickneſs.

oirdupoise Weight.

Drams make 1 Ounce,
marked — *oz.*
Ounces 1 Pound *lb.*
Pounds 1 Quarter of a
Hundred —— *qr.*
Quarters 1 Hundred or
112 lb. — *cwt.*
Hundred 1 Ton *T*
tter, Cheeſe, Fleſh, Grocery
res, and all goods that have
ſte, are weighed by this.

Troy Weight.

Grains make 1 Carat
Grains 1 Pennyweight
marked — *dwt.*
Pennyweights 1 Ounce *oz.*
Ounces 1 Pound *lb.*
By this Weight Jewels, Gold,
ver, Amber, &c are weigh-
14 *Ounces,* 11 *Penny-*
ghts, and 15½ *Grains Troy,*
are equal to a Pound Averdupoize.

Apothecaries Weight.

20 Grains make 1 Scruple,
marked — ℈
3 Scruples 1 Drachm ʒ
8 Drachms 1 Ounce ℥
12 Ounces 1 Pound, or Pint
of Water *lb.*
Apothecaries compound their medicines by this Weight, but buy and ſell by Avoirdupoize.

Wool Weight.

7 Pounds make 1 Clove
2 Cloves 1 Stone
2 Stone 1 Todd
6½ Todd 1 Wey
2 Weys 1 Sack
12 Sacks 1 Laſt

Hay and Straw.

A Load of either contains 36 Truſſes
A Truſs of Hay 56 Pounds
A Truſs of Straw 36 Pounds

Time.

60 Seconds make 1 Minute
60 Minutes 1 Hour
24 Hours 1 Day
7 Days 1 Week
4 Weeks 1 Month
13 Months, 1 Day, 6 Hours
or 365 Days, and 6
Hours, 1 Year.

THE END.

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